

Kirsten Hogenson

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Research interests Graph theory; extremal and probabilistic combinatorics; partially-ordered sets; combinatorial game theory; combinatorial matrix theory.

Education *Iowa State University* Ph.D. in Mathematics, May 2016
Advisor: Ryan R. Martin
Dissertation: Random and deterministic versions of extremal poset problems

University of North Dakota B.S. in Mathematics, May 2010
Minor: Computer Science
Honors: Summa Cum Laude, Phi Beta Kappa

Employment Associate Professor, Department of Mathematics and Statistics, Skidmore College, June 2025 – present

Assistant Professor, Department of Mathematics and Statistics, Skidmore College, August 2020 – May 2025

Visiting Assistant Professor, Department of Mathematics and Computer Science, Colorado College, August 2016 – May 2020

Lead Teaching Assistant, Department of Mathematics, Iowa State University, August 2014 – May 2015

Teaching Assistant, Department of Mathematics, Iowa State University, August 2010 – May 2016

Financial support Faculty Student Summer Research Grant (Skidmore College). *Optimal solutions for rainbow static Mastermind*. May 27 – June 27, 2025. (\$6,925)

Faculty Student Summer Research Grant (Skidmore College). *Optimal solutions for static Mastermind*. May 30 – June 30, 2023. (\$3,525)

Faculty Student Collaborative Research Grant (Colorado College). *Push to the finish: Investigating winning strategies in variants of the board game Abalone*. May 20 – June 21, 2019. (\$4,031)

Institute for Mathematics and its Applications (IMA) Thematic Year on Discrete Structures: Scholar in-residence. February 1-28, 2015. (\$1,686)

Awards Aggie Ho Teaching Award, Iowa State University, Fall 2015.
Teaching Excellence Award, Iowa State University, Fall 2013.

**Publications
(Student
coauthors
indicated by *)**

11. Z. Berikkyzy, K. Hogenson, R. Kirsch and J. McDonald. Maximizing the number of stars in graphs with forbidden properties. Under review at *Discrete Mathematics*. Submitted April 2025. <https://doi.org/10.48550/arXiv.2504.01364>
10. J. Gutstadt*, K. Hogenson and J. Koerner*. Solving Abalone on small boards. Under review at *Minnesota Journal of Undergraduate Mathematics*. Submitted August 2023. <https://doi.org/10.48550/arXiv.2308.03208>
9. K. Hogenson, D. Johnston and S. O'Hara*. Equitable choosability of prism graphs. *Discuss. Math. Graph Theory*, 45 (2025), 311-330. <https://doi.org/10.7151/dmgt.2534>
8. G. Araujo-Pardo, Z. Berikkyzy, J. Faudree, K. Hogenson, R. Kirsch, L. Lesniak and J. McDonald. Finding long cycles in balanced tripartite graphs: A first step. *Research trends in graph theory and applications*, 1-10, Assoc. Women Math. Ser., 25, Springer, Cham, ©2021. https://doi.org/10.1007/978-3-030-77983-2_1
7. J. Fallon, K. Hogenson, L. Keough, M. Lomelí, M. Schaefer and P. Soberón. A note on the maximum rectilinear crossing number of spiders. *J. Combin. Math. Combin. Comput.*, 113 (2020), 127-139. <https://doi.org/10.48550/arXiv.1808.00385>
6. T.H. McNicholl, K. Frank, K. Hogenson, J. Roat and M.P. Carlson. Improving student success and supporting student meaning-making in large-lecture precalculus classes, *PRIMUS*, 31 (2020), no. 7, 792-810. <https://doi.org/10.1080/10511970.2020.1737850>
5. K. Hogenson, R.R. Martin and Y. Zhao. Tiling tripartite graphs with 3-colorable graphs: The extreme case, *Graphs Combin.*, 34 (2018), no. 5, 1049-1075. <https://doi.org/10.1007/s00373-018-1929-1>
4. Z. Berikkyzy, C. Cox, M. Dairyko, K. Hogenson, M. Kumbhat, B. Lidický, K. Messerschmidt, K. Moss, K. Nowak, K. Palmowski and D. Stolee. (4,2)-choosability of planar graphs with forbidden substructures, *Graphs Combin.*, 33 (2017), no. 4, 751-787. <https://doi.org/10.1007/s00373-017-1812-5>
3. S. Butler, C. Erickson, L. Hogben, K. Hogenson, L. Kramer, J. C.-H. Lin, R. R. Martin, D. Stolee, N. Warnberg and M. Young. Rainbow arithmetic progressions, *J. Comb.*, 7 (2016), no. 4, 595-626. <https://dx.doi.org/10.4310/JOC.2016.v7.n4.a3>
2. K. Hogenson, S. Negaard and R. J. Zerr. Matrix sequences associated with the Ducci map and the mediant construction of the rationals. *Linear Algebra Appl.*, 437 (2012), no. 1, 285-293. <https://doi.org/10.1016/j.laa.2012.02.010>
1. E. Almodovar, L. DeLoss, L. Hogben, K. Hogenson, K. Murphy, T. Peters and C. A. Ramirez. Minimum rank, maximum nullity and zero forcing number for selected graph families. *Involve*, 3 (2010), no. 4, 371-392. <https://doi.org/10.2140/involve.2010.3.371>

**Teaching
experience**

At Skidmore College:

Course	Role	Semester(s)
HF 200 The Costs of Generative AI	Co-Instructor	Sp25
MA 110 Mathematics Toolkit	Instructor	Sp21, Sp22, F24, F25
MA 111 Calculus 1	Instructor	Sp22, Su22, Sp23, F24
MA 200 Linear Algebra	Instructor	F22, F24
MA 211 Calculus 3	Instructor	Sp23, F23
MA 213 Calculus 4	Instructor	F23
MA 215 Intro to Proof	Instructor	F20, F21, Sp22, F22
MA 275H Mathematics Research – Topic: Optimal solutions for static Mastermind	Advisor	Sp21
MA 275H Mathematics Research – Topic: Secure image transmission using RSA encryption	Advisor	Sp23
MA 302 Graph Theory	Instructor	F21, F23, F25
MA 303 Intro to Analysis	Instructor	Sp21, F22
MA 371 Independent Study Math – Topic: Combinatorics	Instructor	Sp25
MA 376 Senior Seminar – Topic: Linear optimization	Instructor	Sp25
MA 381 and MA 382 Senior Thesis – Topic: Equitable list colorings of prism graphs	Advisor	F20-Sp21
MA 381 and MA 382 Senior Thesis – Topic: Skolem labeling on directed graphs	Advisor	F23-Sp24
MA 381 and MA 382 Senior Thesis – Topic: Rainbow matching sequencibility for complete graphs	Advisor	F24-Sp25
MS 104 Intro to Statistics	Instructor	F20, Sp25
SSP 100 Scribner Seminar – Topic: Secrets, Codes, and Ciphers	Instructor	F25

At Colorado College:

Course	Role	Semester(s)
MA 117 Probability and Statistics	Instructor	Sp18 (2 sections), F18
MA 126 Calculus 1	Instructor	Su18, F18, Sp19, F19

**Teaching
experience
continued**

MA 129 Calculus 2	Instructor	F16 (2 sections), Sp20 (online)
MA 201 Discrete Mathematics	Instructor	Sp18, F18, F19
MA 204 Calculus 3	Instructor	Sp17, Sp20
MA 220 Linear Algebra	Co-Instructor	F16
MA 220 Linear Algebra	Instructor	Sp17, F17
MA 228 Proof-writing Seminar	Co-Instructor	Sp18
MA 251 Number Theory	Instructor	Sp17
MA 255 Independent Study (Undergraduate Research Project) – Topic: Generalizing the game SET	Advisor	Sp18
MA 325 Graph Theory	Instructor	F17, Sp19, Sp20 (online)
MA 499 Senior Capstone Project – Topic: <i>Shut the Box</i> game strategy analysis	Advisor	Sp18
MA 499 Senior Capstone Project – Topic: Maximum upward and downward closed P-free families	Advisor	F18
MA 499 Senior Capstone Project – Topic: On dispersible book embeddings of Moore graphs	Advisor	F19

At Iowa State University:

Course	Role	Semester(s)
MATH 010 High School Algebra	Instructor	F14
MATH 143X Prep for Calculus	Recitation Instructor	F13, Sp14
MATH 143X Prep for Calculus	Instructor	Su15
MATH 165 Calculus 1	Recitation Instructor	F10, Sp11, F12
MATH 165 Calculus 1	Instructor	Sp12
MATH 166 Calculus 2	Instructor	F15

**Professional
development
and training**

Teaching With AI, September 24, 2024. Webinar where author C. Edward Watson presents emerging research on utilizing AI in the classroom and beyond. Conducted online by the Skidmore College Center for Leadership, Teaching and Learning (CLTL) and Macalester College.

No Robot Left Behind: Crafting An AI-Smart Syllabus, August 21, 2024. Online webinar on incorporating effective AI policies when designing a mathematics course syllabus. Conducted online by the Mathematical Association of America (MAA).

Universal Design for Learning: Explore, July 10-30, 2024. Online course on designing learning environments that increase access to engaging and meaningful learning experiences. Conducted online by Harvard Graduate School of Education and CAST.

**Professional
development
and training
continued**

Inclusive Hiring Workshop, Sept 13, 2023. Internal workshop for hiring committee chairs and diversity advocates. Participants learn best practices for equitably performing job searches. Conducted online by Skidmore College.

Maker Training, Summer 2023. Faculty development program where I learned how to design and execute 3D-prints. Instruction occurred during individual meetings with Darren Prodger of the Skidmore College IdeaLab.

Inclusive STEM Teaching Project, March 6-April 20, 2023. Online course for STEM faculty on cultivating inclusive learning environments and becoming a reflective, inclusive practitioner. Conducted online by Boston University. Supplemented by weekly discussions with the Skidmore College Inclusive STEM Learning Community, led by Drs. Aarathi Prasad and Kim Frederick.

Faculty Success Program, May 15-August 6, 2022. Program to help tenure-line faculty with the skills necessary to increase research and writing productivity while maintaining a healthy work-life balance. Organized online by the National Center for Faculty Development & Diversity (NCFDD).

MAA Project NExT Workshop, August 3-6, 2021. Workshop for new mathematics faculty with focus on active learning; balancing teaching, research, and service; and promoting equity. Directed by Dr. David Kung (St. Mary's College of Maryland). Conducted online as part of MathFest.

MAA Project NExT Workshop, January 6-9, 2021. Directed by Dr. David Kung. Conducted online as part of Joint Mathematics Meetings.

MAA Project NExT Workshop, July 27-31, 2020. Directed by Dr. David Kung. Conducted online as part of MathFest.

Toward a Daily Antiracist Agenda, July 30, 2019. Faculty and staff workshop on inclusion, equity and antiracist practices in a university setting. Directed by Dr. Paul Buckley (Colorado College Butler Center). Colorado College, Colorado Springs, CO.

Start Teaching Statistics Using R and RStudio, January 16-17, 2019. Minicourse directed by Drs. Randall Pruim (Calvin College) and Shonda Kuiper (Grinnell College). Joint Mathematics Meetings, Baltimore, MD.

Good to Great: The Journey to Inclusion at CC, August 15-16, 2018. Faculty workshop on diversity and inclusion practices. Conducted by Dr. Paul Buckley (Colorado College Butler Center). Colorado College, Colorado Springs, CO.

Directing Undergraduate Research, January 11, 2018. Minicourse directed by Dr. Aparna Higgins (University of Dayton). Joint Mathematics Meetings, San Diego, CA.

Pathways to Precalculus, Summer 2013. Instructor workshop on inquiry-oriented precalculus teaching strategies conducted by Dr. Marilyn Carlson (Arizona State University). Iowa State University, Ames, IA. (Certification awarded Sept 2015.)

Pearson MyLabsPlus administrator training, Fall 2012. Denver, CO.

- Invited talks** “Equitable choosability of prism graphs,” March 6, 2024. 55th Southeast International Conference on Combinatorics, Graph Theory & Computing, Florida Atlantic University, Boca Raton, FL.
- “Supporting student understanding of 3D-coordinate systems in multivariable calculus,” January 3, 2024. Special Session on Using 3D-Printed and Other Digitally-Fabricated Objects in the Mathematics Classroom, Joint Mathematics Meetings, San Francisco, CA.
- “Equitable choosability of prism graphs,” January 5, 2023. Special Session on If You Build It They Will Come: Presentations by Scholars in the National Alliance for Doctoral Studies in the Mathematical Sciences, Joint Mathematics Meetings, Boston, MA.
- “Equitable list colorings of prism graphs,” October 28, 2021. Special Session on Women in Graph Theory, Society for Advancing Chicanos/Hispanics & Native Americans in Science (SACNAS) National Diversity in STEM Conference, online.
- “An edge condition for long cycles in balanced tripartite graphs,” July 20, 2021. Minisymposium on Women in Graph Theory, Society for Industrial and Applied Mathematics (SIAM) Conference on Discrete Mathematics, online.
- “On the maximum rectilinear crossing numbers of spiders,” November 9, 2019. Special Session on Graph Theory, American Mathematical Society (AMS) Fall Western Section Meeting, University of California Riverside, Riverside, CA.
- “On the maximum rectilinear crossing numbers of spiders,” January 18, 2019. Special Session on If You Build It They Will Come: Presentations by Scholars in the National Alliance for Doctoral Studies in the Mathematical Sciences, Joint Mathematics Meetings, Baltimore, MD.
- “A random version of the r -fork-free theorem,” June 4, 2018. Minisymposium on Combinatorics of Partially Ordered Sets, SIAM Conference on Discrete Mathematics, University of Colorado Denver, Denver, CO.
- “(4,2)-choosability of planar graphs with forbidden structures,” October 8, 2016. Special Session on Recent Advances in Structural and Extremal Graph Theory, AMS Fall Western Section Meeting, University of Denver, Denver, CO.
- “Transitioning to a conceptually-focused precalculus program,” June 20, 2016. MAA Conference on Precalculus to Calculus: Insights and Innovations, University of Saint Thomas, St Paul, MN.
- “A random version of the r -fork-free theorem,” April 16, 2016. Special Session on Probabilistic and Extremal Combinatorics, AMS Spring Central Section Meeting, North Dakota State University, Fargo, ND.
- “Zero forcing number on the counterprism of graphs,” January 6, 2016. Special Session on Research from the 2014 and 2015 Rocky Mountain-Great Plains Graduate Research Workshop in Combinatorics, Joint Mathematics Meetings, Seattle, WA.

**Invited talks
continued**

“Precalculus reform at Iowa State University,” October 22, 2014. Iowa Council of Teachers of Mathematics-Iowa Science Teaching Section Math and Science Conference, Iowa State University, Ames, IA.

“Tiling tripartite graphs with 3-colorable graphs: The extreme case,” September 20, 2014. Special Session on Problem Solving in Extremal Combinatorics and Combinatorial Geometry, AMS Fall Central Section Meeting, University of Wisconsin-Eau Claire, Eau Claire, WI.

**Contributed
talks**

“Rainbow static Mastermind,” January 31, 2025. Mathematics and Statistics Colloquium, Skidmore College, Saratoga Springs, NY.

“Rainbow static mastermind,” September 28, 2023. Mathematics Department Student Seminar, Union College, Schenectady, NY.

“Cryptanalysis of simple substitution ciphers,” September 24, 2021. Mathematics and Statistics Departmental Seminar, Skidmore College, Saratoga Springs, NY.

“Math Morsel: How to win at Nim,” April 20, 2021. Pi Mu Epsilon Induction Ceremony, Skidmore College, Saratoga Springs, NY.

“Finding long cycles in multipartite graphs,” October 25, 2019. Fearless Friday Seminar, Colorado College, Colorado Springs, CO.

“Graph drawings with many crossings,” October 27, 2017. Fearless Friday Seminar, Colorado College, Colorado Springs, CO.

“A random version of the r -fork-free theorem,” January 25, 2016. Discrete Mathematics Seminar, University of Colorado Denver, Denver, CO.

“A random version of the r -fork-free theorem,” January 8, 2016. Association for Women in Mathematics (AWM) Workshop Poster Session and Reception, AMS/MAA Joint Mathematics Meetings, Seattle, WA.

“A random version of the r -fork-free theorem,” November 17, 2015. Discrete Mathematics Seminar, Iowa State University, Ames, IA.

“Tiling tripartite graphs with 3-colorable graphs: The extreme case,” September 23, 2014. Discrete Mathematics Seminar, Iowa State University, Ames, IA.

“Minimum Ranks of Ciclos and Estrellas Graph Families,” January 15, 2010. MAA Poster Session on Research by Undergraduate Students, AMS/MAA Joint Mathematics Meetings, San Francisco, CA.

“Minimum Ranks of Ciclos and Estrellas Graph Families,” October 24, 2009. MAA North Central Section Meeting, University of North Dakota, Grand Forks, ND.

“A characterization of the minimum rank of the Ciclos and Estrellas graph families,” July 30, 2009. Alliance Research Symposium, University of Iowa, Iowa City, IA.

Research workshops	Workshop for Women in Graph Theory and Applications, research workshop hosted by IMA, August 19-23, 2019.
	Beyond Planarity: Crossing Numbers of Graphs, part of AMS Mathematics Research Communities, Snowbird Resort, UT, June 11-17, 2017.
	Rocky Mountain-Great Plains Graduate Research Workshop in Combinatorics, hosted by Iowa State University, Ames, IA, June 1-12, 2015.
	Rocky Mountain-Great Plains Graduate Research Workshop in Combinatorics, hosted jointly by University of Denver and University of Colorado Denver, Denver, CO, July 28-August 8, 2014.
	Nebraska IMMERSE pre-graduate program, hosted by University of Nebraska Lincoln, Lincoln, NE, Summer 2011.
Professional service	Writer/Judge, 4 College Math Contest (for Denison University, Kenyon College, Ohio Wesleyan University and Wittenberg University), 2020 and 2025.
	Judge, Undergraduate Student Poster Session, Joint Mathematics Meetings, 2017, 2018, 2019, 2020, 2021, and 2023.
	Co-organizer, One-Minute Teaching Innovations Webinar, hosted online by MAA Project NExT, March 17, 2021.
	Faculty mentor, Sonia Kovalevsky Mathematics Day, Iowa State University, Ames, IA, March 30, 2019.
	Panelist, 7 th Annual Sonia Kovalevsky Day, University of Wisconsin Eau Claire, Eau Claire, WI, March 9, 2019.
	Co-Organizer, 14 th Annual Pikes Peak Regional Undergraduate Mathematics Conference, Colorado College, Colorado Springs, CO, February 25, 2017.
	Participant, MAA Instructional Practices Guide focus group, Joint Mathematics Meetings, Atlanta, GA, January 5, 2017.
	Proctor, Great Plains Math League, hosted by Iowa State University, 2012-2014.
	Contributor to AMS MathSciNet Mathematical Reviews, 2018-2020.
Referee for academic journal articles:	
• Order: 2021, 2024 • European Journal of Combinatorics: 2020, 2022 • Electronic Journal of Combinatorics: 2018 • Electronic Journal of Linear Algebra: 2017 • Linear Algebra and its Applications: 2016	

Departmental and institutional service	Member, Tenure Committee for Mathematics Faculty, Skidmore College, Fall 2025. Member, Mathematics and Statistics Department Annual Assessment Committee, Skidmore College, Spring 2025. Member, Reappointment Committee for NTT Mathematics Faculty, Skidmore College, Fall 2024. Member, 3rd Year Reappointment Committee for TT Mathematics Faculty, Skidmore college, Fall 2024 and Fall 2025. Member, Colloquium Committee, Department of Mathematics and Statistics, Skidmore College, Fall 2024-present. Consultant, Universal Design for Learning Consultancy Program, Center for Leadership, Teaching and Learning, Skidmore College, Fall 2024. Co-facilitator, Scholarly and Creative Endeavors Work Group, Center for Leadership, Teaching and Learning, Skidmore College, Summer 2024. Member and Diversity Advocate, Assistant, Associate, or Full Professor of Mathematics Hiring Committee, Skidmore College, 2023-2024. Member, Assistant Professor of Mathematics Hiring Committee (hiring two positions), Skidmore College, 2022-2023. Organizer, Seminar, Department of Mathematics and Statistics, Skidmore College, Fall 2020-Spring 2023. Member, Committee on Educational Policies and Planning (CEPP), Skidmore College, 2021-2022. Member, Long-Range Planning Committee, Department of Mathematics and Statistics, Skidmore College, 2021. Organizer, Colorado College Rawles Prize Competition, 2018, 2019 and 2020. Faculty mentor, Colorado College AWM Student Section, 2019-2020. Member, New Calculus Textbook Selection Committee, Department of Mathematics and Computer Science, Colorado College, 2018-2019. Liaison, MyLabsPlus and Assessment and Learning in Knowledge Spaces (ALEKS) placement exam, Iowa State University Department of Mathematics, 2013. Graduate student peer mentor, Iowa State University Department of Mathematics, 2011, 2012, and 2015.
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- Memberships** Pi Mu Epsilon: New York Alpha Theta Chapter, 2021-present.
 Society for Industrial and Applied Mathematics, 2013-2016.
 Iowa State University EDGE mentoring cluster, 2013-2016.
 American Mathematical Society, 2011-present.
 Association for Women in Mathematics, 2011-2016, 2021-present.
 Phi Beta Kappa: Alpha Chapter of North Dakota, 2010-present.
 National Alliance for Doctoral Studies in Mathematics, 2009-present.
 International Linear Algebra Society (ILAS), 2009-present.
- References** *Dr. Andrea Bruder, Former Dept Chair* abruder@coloradocollege.edu
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